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(54) Device for dispensing multiple components.

(57) A dispensing device (10) includes two chambers (14,16), one for holding a resin and another for a hardener. Each chamber has an exit port (26,28) formed in a neck (18) which contains passageways (17,19) leading to each of the chambers. The neck is equipped with external threads (24) which mate with internal threads (54) on a nozzle adjusting nut (50). A nozzle (36), which is carried by the nut (50), can be moved from an open position to a closed position in which a portion (37) of the nozzle's base (38) closes the ports (26,28). A divider (34) projects from the neck (18) at a location near and between the ports (26,28) and the nozzle (36) has a slot (42) to receive the divider (34). The divider serves to prevent mixing of the components until well after they exit the ports. The divider/slot arrangement further prevents relative rotation between the nozzle and the neck. Three separate sealing surfaces are formed on the base of the nozzle. One (40) is cylindrical and seals against an O-ring (30) carried by the neck. Two others (48,49) are laterally disposed and are generally perpendicular to the axis of the device. The lateral sealing surfaces are on opposite sides of the slot (42) and move into and out of sealing engagement with the ports. The nut (50) operates as a valve to open and close the ports (26,28), and the nut acts as a retainer to non-rotatably hold the nozzle (36) on the neck.

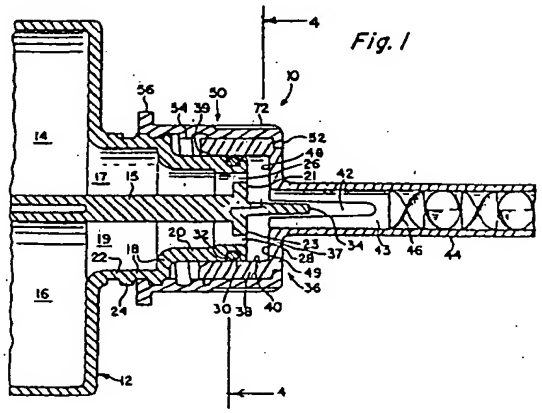

Fig. 1

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DEVICE FOR DISPENSING MULTIPLE COMPONENTS

The present invention relates to a device for dispensing multiple components such as adhesive mixtures used in the field of building construction.

The use of two component adhesive mixtures as a construction material naturally has both advantages and disadvantages.

One disadvantage of using two component adhesive mixtures as a construction material has been the difficulty of conveniently packaging the components so that incremental amounts of adhesive can be used at irregular intervals. The need to mix precise amounts of component material together with a limited pot life has created the need for improved dispensing devices. Another problem associated with the use of multi-component adhesives, and with any construction products is the rough handling of such products given by construction workers. Frequently, devices used in construction are thrown or fall from ladders or down uncarpeted stairs, are kicked, or are stepped on.

A preferred embodiment of the present invention, which overcomes these problems, at least in part, includes two chambers, one for holding a resin and another for a hardener. Each chamber has an exit port formed in a neck which contains passageways leading to each of the chambers. The neck is equipped with external threads which mate with internal threads on a nozzle adjusting nut. A nozzle, which is carried by the nut, can be moved from an open position to a closed position in which a portion of the nozzle's base closes the ports. A divider or tab projects from the neck at a location near and between the ports, and the nozzle has a slot to receive the divider. The divider serves to prevent mixing of the components until well after they exit the ports. The divider/slot arrangement further prevents relative rotation between the nozzle and the neck. Three separate sealing surfaces are formed on the base of the nozzle. One is cylindrical and seals against an 0-ring carried by the neck. Two others are laterally disposed and are generally perpendicular to the axis of the device. The lateral sealing surfaces are on opposite sides of the slot and move into and out of sealing engagement with the ports.

A device for dispensing multiple components, especially fluid components, in accordance with all of the aspects of the present invention defined in the following independent claims, will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a cross-sectional view showing a device of the present invention in an open position;

Figure 2 is a cross-sectional view similar to Figure 1 showing the same device in a closed position;

Figure 3 is a partial sectional view of the device shown in Figure 1, the sectional portion lying in a plane 90 degrees from the plane corresponding to the Figure 1 view;

Figure 4 is a sectional view taken along line 4-4 of Figure 1; and

Figure 5 is a sectional view of a cap usable with the device of the present invention.

Figure 1 shows a device made in accordance with the present invention. The device 10 is shown in the open position. The body 12 is comprised of a first chamber 14, a second chamber 16 and a neck 18. Ports 26 and 28 correspond to chambers 14 and 16 respectively, and each of the ports is in fluid communication with only its corresponding chamber. The passageways 17 and 19, which connect respective ports and chambers, are divided by a web 15.

The neck 18 has external threading 24 which is adapted to engage mating internal threading 54 formed on the adjusting nut 50. The threading 24 is formed on the lower part 22 of the neck. The upper part 20 of the neck 18 carries a seal 30, an O-ring, disposed in a circumferential groove 32. The passageways 17 and 19 are each larger in the lower part 22 of the neck and become narrower in the upper part 20. Finally, each of the passageways 17 and 19, merge with their respective ports 26 and 28, which are arcuate or crescent shaped.

A nozzle 36 is fitted over the upper part 20 of the neck 18. The nozzle 36 is comprised of a base 38 having a shoulder 37. The inside axial surface of the base is a smooth cylindrical surface 40 which engages the seal 30.

A beveled edge 39 is formed at the lower end of the surface 40 to facilitate insertion of the upper part 20 of the neck 18 into the base 38. The nozzle 36 includes a pair of ribs 41, shown in Figure 3, which snappingly engage an internally extending lip 52 on the upper end of the nut 50.

The nozzle 36 also includes a tube 44 extending from the shoulder 37. The tube 44 includes at its base a slot 42 for receiving the divider 34 formed on the end of the neck 18. At the end 43 of the slot 42 a tortuous path for the components is formed by the insertion of a static mixer 46 in the tube 44.

The engagement between the adjusting nut 50 and the nozzle 36 is such that the two parts move together, but only in the axial direction. The nut is free to rotate relative to the nozzle 36, while the

divider 34 engages the slot 42, which prevents rotational movement of the nozzle 36.

The flow of the components, or valving thereof, is controlled by operation of the adjusting nut 50. Rotation of the nut 50, and the resulting axial advancement thereof due to engagement with the threads 24 and 54, causes axial movement of the nozzle 36 because the lip 52 engages the base 38 of the nozzle when the nut is moved toward the chambers 14 and 16. When the nut 50 is moved toward the chambers 14 and 16, the sealing surfaces 48 and 49 cover the ports 26 and 28. The sealing surfaces 48 and 49 are generally perpendicular to the axis of the device and generally parallel to the end surfaces 21 and 23 on the neck 18. The sealing surfaces 48 and 49 are disposed on opposite sides of the slot 42.

Excessive axial movement of the nut 50, and thus the nozzle 36, away from the chambers 14 and 16 may be prevented by the inclusion of a stop or retaining plate on the dispensing tool (not shown) used to force components out of the chambers 14 and 16. The retaining plate or stop should have an opening large enough to allow movement of the nut 50 therethrough. This will allow rotation of the nut without removing the device 10 from the tool. The opening in the plate or stop should be small enough to prevent passage of the flange 56 through the opening. Interference between the flange 56 and the plate or stop acts as a limit, preventing complete removal of the nut and nozzle while the device 10 is in the tool. Such limit also controls the extent to which the ports 26 and 28 can be opened. From the foregoing it can be seen that the nut 50 serves two functions. It operates as a valve for opening and closing the ports 26 and 28. The nut 50 also operates as a mounting means for holding the non-rotating nozzle 36.

When the nut 50 is moved away from the chambers 14 and 16, the components stored in the chambers are free to flow out of the chambers through the passageways 17 and 19, and out of the ports 26 and 28. However, the components are kept from contacting each other until they have entered and passed a substantial distance into the tube 44. Isolation of the components until well after they have exited the ports is important for the reusability of the device. Mixing of or contact between the components at or near the ports would cause the ports to clog upon chemical reaction of the components.

Figures 3 and 4 show other aspects of the herein described embodiment. Splines 70 and grooves 72 facilitate rotation of the nut 50. The section portion of Figure 3 clearly shows the full lateral extent of the divider 34 into the slot 42. Figure 3 also shows the ribs 41 which snappingly retain the nozzle 36 and nut 50 in axial engagement, while allowing relative rotation thereof.

Figure 4 shows sections of the device at two levels. One side of Figure 4 shows that the port 26 is an arcuate opening, which is required because of the shape of the sealing surface 48 and its joining with the circular tube 44. The other side of Figure 4 shows the shape of the passageway 19 at a location just behind the port 28.

The cap 60 shown in Figure 5 is intended for use in situations where storage of partially emptied chambers is anticipated for extended periods of time. Short term storage can be achieved by simply moving the adjusting nut 50 to the closed position. However, such a procedure leaves the nozzle 36 projecting from the device. For more compact storage, the nozzle 36 can be removed by unthreading the nut 50, disengaging the nozzle from the nut, and replacing the nozzle with the cap 60. When the cap is snapped onto the neck 18, projections 64 and 66 extrude component material back through the ports 26 and 28, respectively keeping the ports sealed and clear. The sealing surface 40a is adapted to engage the seal 30 on the neck 18 for a positive seal during shipping and storage.The slot 42a receives the divider 34.

It should be noted that it is preferable to have a threaded connection between the adjusting nut 50 and the neck 18. Such a connection provides a firm attachment between the parts, which is important in helping to withstand the rough handling generally given to tools and other articles used in construction. However, it may be possible to provide alternative connection means between the nut 50 and the neck 18, in which case the nut 50 may be better termed a sleeve for retaining the nozzle 36.

Claims

1. A device (10) for dispensing multiple components comprising a body (12) having a plurality of chambers (14,16), each of the chambers having a respective port (26,28), the body having a neck (18), and a nozzle (36) having a base (38) shaped for sealing engagement with the neck, the base including a generally cylindrical surface (40) for sealingly engaging circumferential portions (20) of the neck and a lateral surface (37) for sealingly engaging end portions (21,23) of the neck, valve means (50) for non-rotatably moving the base (38) into and out of sealing engagement with the ports (26,28), and means (34) for maintaining isolation of the components until after the components have moved a substantial distance from the ports (26,28) into the nozzle (36).

2. A device (10) for dispensing multiple components comprising a body (12) having a plurality of chambers (14,16), each of the chambers having a

respective port (26,28), the body having a neck (18), and a nozzle (36) having a base (38) shaped for sealing engagement with the neck, the base including a generally cylindrical surface (40) for sealingly engaging circumferential portions (20) of the neck and a lateral surface (37) for sealingly engaging end portions (21,23) of the neck, an adjusting nut (50) in axial interference with and rotatable about the nozzle (36), and means (34,42) for preventing relative rotation between the nozzle (36) and the neck (18) while allowing relative axial movement thereof.

3. A device (10) for dispensing multiple components comprising a body (12) having a plurality of chambers (14,16), each of the chambers having a respective port (26,28), the body having a neck (18), and a nozzle (36) having a base (38) shaped for sealing engagement with the neck, an adjusting nut (50) in axial interference with and rotatable about the nozzle (36), and means (34,42) for preventing relative rotation between the nozzle (36) and the neck (18) while allowing relative axial movement thereof, as well as means (34) for maintaining isolation of the components until after the components have moved a substantial distance from the ports (26,28) into the nozzle (36).

4. A device according to any preceding claim, wherein the means for maintaining isolation of the components and/or the means for preventing relative rotation between the nozzle and the neck is a divider (34) formed on the neck (18) and shaped to fit into a slot (42) formed in the nozzle (36).

5. A device according to any preceding claim, wherein closure means (60) is provided for replacing the nozzle (36) when the device (10) is not in use.

6. A device according to claim 4 and claim 5, wherein the closure means (60) is provided with a slot (42a) for housing the divider (34).

7. A device according to claim 5 or claim 6, wherein the closure means (60) is provided with a plurality of projections (64,66) shaped to match the ports (26,28) upon installation of the closure on the device.

8. A device according to any preceding claim, wherein a seal member (30) is disposed about an outer periphery (20) of the neck (18) and an inner periphery (40) of the base (38) of the nozzle (36).

9. A device according to any preceding claim, wherein the ports (26,28) are arcuate in shape, and the base (38) of the nozzle (36) has a pair of surfaces (48,49) axially movable into positions closing off the ports.

10. A device according to any preceding claim, wherein the base (38) of the nozzle (36) has at least one rib (41) which snaps into engagement with the valve means (50) or the adjusting nut (50).

Fig. 1

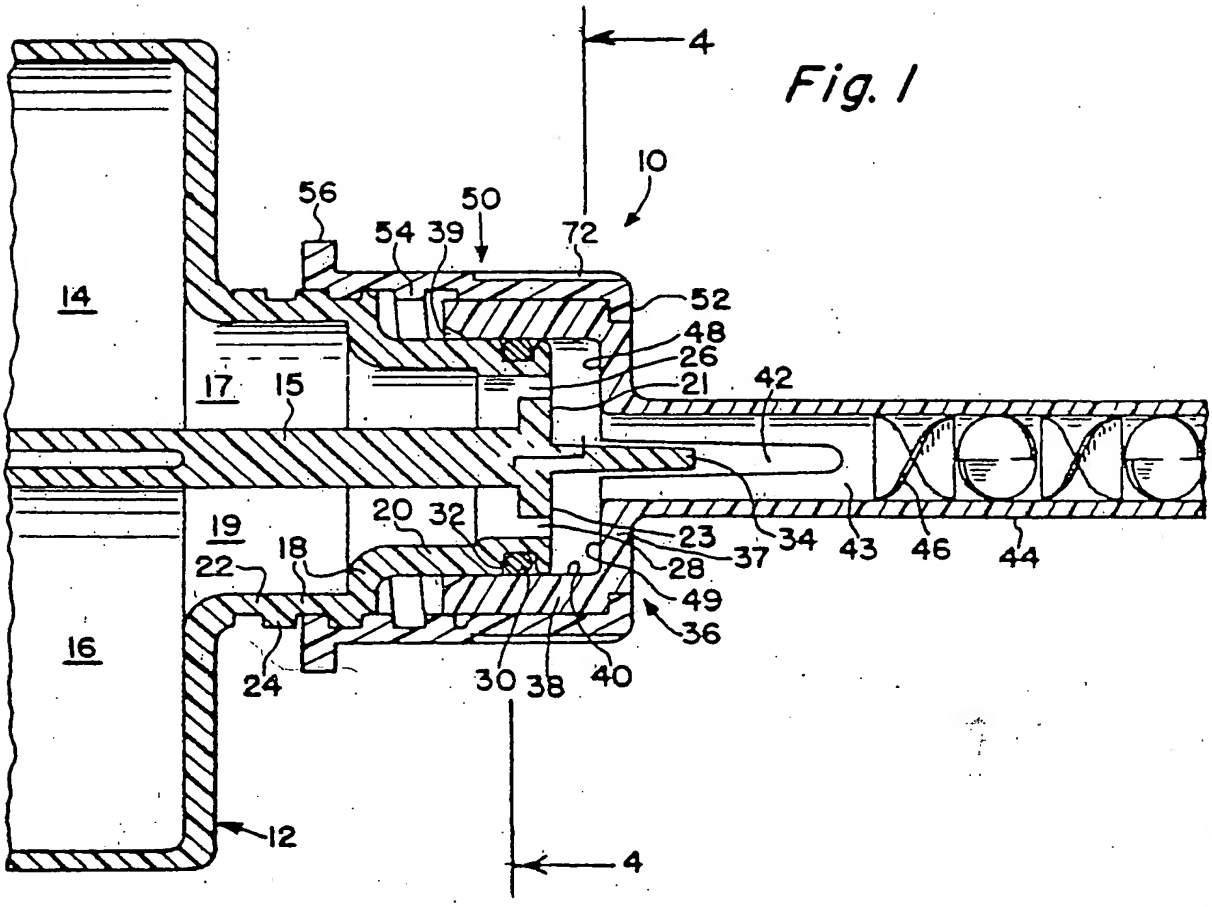
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Fig. 2

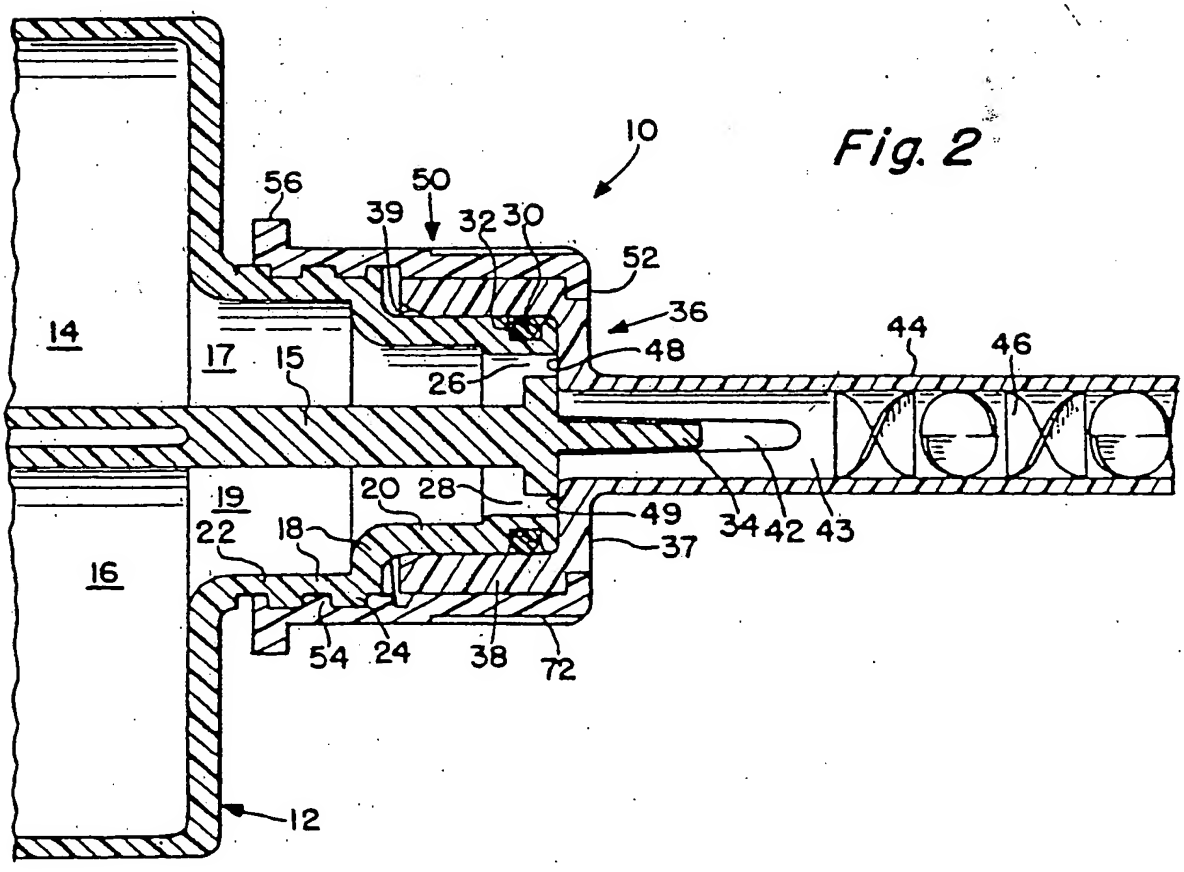
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Fig. 3

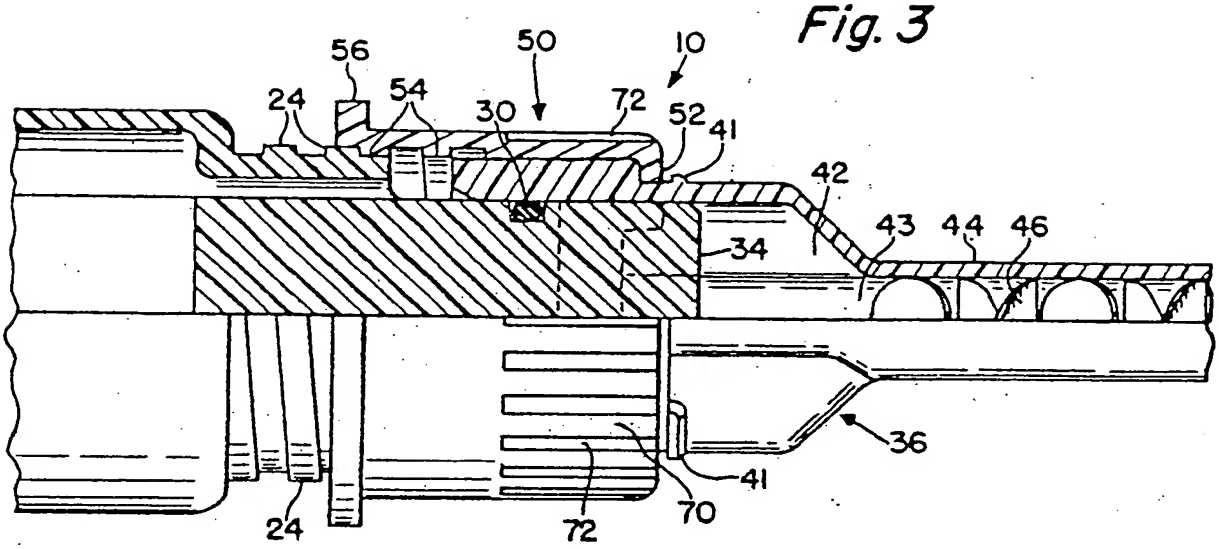

Fig. 4

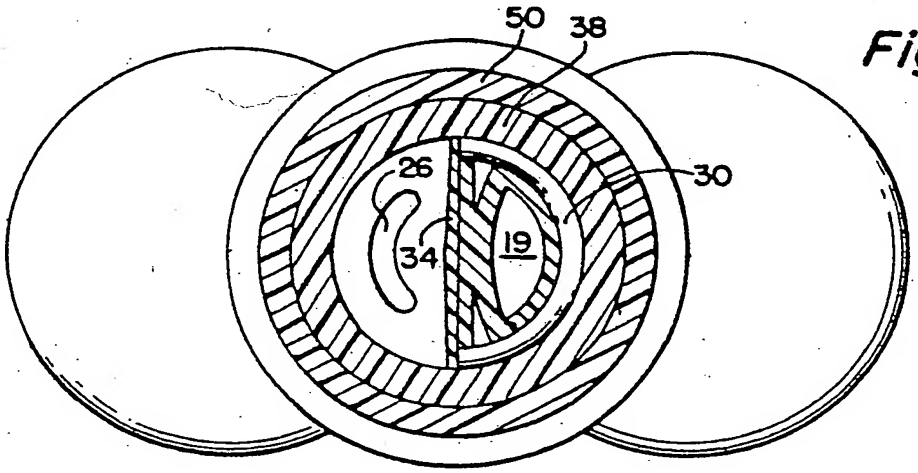

Fig. 5